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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,407	12/15/2000	Benedict G. Pace	NH-07a	8815

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John F McCormack
116 Milburn Lane
Roslyn Heights, NY 11577

EXAMINER

GUERRERO, MARIA F

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

18

Office Action Summary	Application No. 09/737,407	Applicant(s) PACE, BENEDICT G.	
	Examiner Maria Guerrero	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-38 is/are pending in the application.
- 4a) Of the above claim(s) 27-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the amendment filed October 17, 2005.

Status of Claims

2. Claims 1-15 are canceled. Claims 16-38 are pending.

Election/Restrictions

3. Claims 27-38 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 16 and 19-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Kumar et al. (U.S. 4,493,856).

Kumar et al. teaches providing a high temperature insulating ceramic substrate substrate (alumina, glass ceramic) having metallic pads as base for the package, depositing a metal over the metallic pads (Fig. 1, col. 5, lines 40-50). Kumar et al discloses the bumps comprising a metal (copper, gold) having a melting point over 350°C and below the melting point of the metal (molybdenum) forming the metallic pads

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(Fig. 1-5, col. 5, lines 40-68, col. 6, lines 1-55, col. 9, lines 1-45, col. 10, lines 1-45).

Kumar et al. teaches melting the deposited metal at a temperature below the melting point of the metallic pads so that the deposited metal draws back onto the metallic pads and cooling the deposited metal to form metal bumps (Fig. 1-5, col. 6, lines 5-30, col. 8, lines 1-35). Furthermore, Kumar et al. discloses the metallic pads having refractory metals and the bumps having gold (Fig. 1-5, col. 8, lines 20-68, col. 9, lines 1-45, col. 10, lines 1-45).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17-18 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar et al. (U.S. 4,493,856) in view of Yamaji et al. (U.S. 6,159,837).

Regarding claims 17-18 and 25-26, Kumar et al. does not specifically show the metal being in a powdered form and being deposited by screen-printing. However, Yamaji et al. teaches depositing the metal by screen-printing in a powdered form (col. 4, lines 20-25, col. 6, lines 3-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the conventional step of depositing the metal by screen-

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printing in a powdered form in Kumar et al. reference as taught Yamaji et al. in order to provide a highly reliable semiconductor device with reduce thermal stress (Yamaji et al., Abstract).

6. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar et al. (U.S. 4,493,856) in view of Kondo et al. (U.S. 5,656,858).

Regarding claims 23-24, Kumar et al. does not specifically show coating the bumps with a barrier metal and the using a solder aid to enhance solderability. However, Kondo et al. teaches the bump being cover with a wiring pattern and being solder in order to be electrically connected to an external substrate (Fig. 1, col. 3, lines 40-45).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kumar et al. reference by including the step of coating the bumps with a barrier metal and the use a solder aid to enhance solderability as taught by Kondo et al. in order to connect to an external substrate while improving adhesion (Kondo et al., Abstract).

Response to Arguments

7. Applicant's arguments with respect to claims 16-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Warner et al. (US 5,108,027), Marrs (US 5,795,818) and Horiuchi et al. (US 5,229,213) teach several embodiments related to applicant's disclosure.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 29, 2005

Maria F. Guerrero
MARIA F. GUERRERO
PRIMARY EXAMINER